REMARKS

Claims 42, 44-48, 50-55, and 57-65 are pending in this application. By the Office Action, claims 42, 44-45, 47-48, 50-55 and 57-65 are rejected under 35 U.S.C. §102(b) or §103(a), and claim 46 is rejected under 35 U.S.C. §103(a).

I. Rejections Under 35 U.S.C. §102(b) and/or §103(a)

The Office Action rejects claims 42, 44-45, 47-48, 50-55 and 57-65 under 35 U.S.C. §102(b), or alternatively under 35 U.S.C. §103(a), over Okamoto, and rejects claim 46 under 35 U.S.C. §103(a) over Okamoto. Because the rejections are related, they are addressed together. Applicants respectfully traverse the rejections.

The relevant portion of claims 42 and 55 recite, "... the first resin layer has a first etching rate when etched with a alkali-aliphatic amine solution and the second resin layer has a second etching rate when etched with the alkali-aliphatic amine solution; and a ratio of the first etching rate to the second etching rate is from 4:1 to 1:1." However, at least this limitation is not disclosed, taught, or suggested by Okamoto.

The Office Action admits that Okamoto does not specifically disclose, or even mention, any relation between a ratio of the first etching rate to the second etching rate. However, the office Action argues that because Okamoto discloses that the layers can be of the same general composition as claimed, then they must inherently have the same properties, including etching rate ratio. Applicants disagree.

In order for prior art to anticipate a claimed invention on the ground that a limitation is inherently disclosed in the reference, the inherency must be certain. The fact that a prior art reference may have the characteristics of the claimed product is not sufficient. Inherency must be a <u>necessary</u> result and not merely a <u>possible</u> result; the mere fact that a certain thing may result from a given set of circumstances is not enough. <u>In re Oelrich</u>, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); <u>Ex parte Keith and Turnquest</u>, 154 USPQ 320, 321 (Pat. Off.

Bd. App. 1966). Accordingly, the Patent Office must provide some evidence or scientific reasoning to establish the reasonableness of the Office's belief that the limitation is an inherent characteristic of the prior art. Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986). Similarly, in order to establish a prima facie case of obviousness based on inherency, it is incumbent on the Patent Office to establish this asserted inherency. See In re King, 231 U.S.P.Q. 136 (Fed. Cir. 1986). The Office Action must provide a basis in fact and/or technical reasoning to reasonably support the assertions that the allegedly inherent characteristic of the claimed invention necessarily flows from the teachings of the reference. See Ex parte Levy, 17 USPQ2d 1461, 1464 (PTO Bd. Appl. & Int. 1990).

In the present case, the Office Action fails to properly establish a case of obviousness of the claimed etching rate ratio. The sole basis for the rejections is that Okamoto discloses that the layers can be formed of a thermoplastic polyimide film and a nonthermoplastic polyimide film. As a particularly suitable thermoplastic polyimide film, the Office Action points to Okamoto's disclosure of the use of the APICAL® material, which is a pyromellitic dianhydride polyimide material. The Office Action then asserts that because Okamoto discloses a generic type of material (pyromellitic dianhydride polyimide) that is also mentioned in the present specification, then the claimed invention and Okamoto must each have the same etching rate properties.

However, the Office Action fails to provide the requisite evidence or scientific reasoning to establish the reasonableness of the assertion that the etching rate ratio limitation is an inherent characteristic of the prior art. First, it is apparent that the etching rate ratio is dependent upon the materials used for both layers in the structure, and thus the fact that one layer may allegedly be the same pyromellitic dianhydride polyimide type of material does not establish that the etching rate ratio would be the same. Second, the Office Action fails to acknowledge that in fact the APICAL® polyimide material does not refer to a single material,

but actually refers to an entire product line of different grades and types of materials. See, for example, the attached product description of the APICAL® material product line, which shows that there are a wide range of types and grades of APICAL® materials, with different physical, mechanical, and electrical properties.

The Office Action also fails to recognize that the etching rate for a general type of material can vary greatly, based on differences in the material itself, or even differences in the heat history incurred for the same type of material. Thus, not only can the etching rate vary based on slight chemical differences in the polyimide material, such as in the different APICAL® material types and grades, but it can also vary for the same type and grade of material based on the heat history incurred in that material. Thus, the claimed etching rate ratio cannot be considered inherent in the materials of Okamoto.

A feature of the claimed invention is that the ratio of the etching rate of each resin layer in the laminate is controlled to avoid the problem as shown in Figure 1 of the application. For example, the shape of the laminate after etching as shown in Figure 1 will cause serious and/or fatal problems to an electronic circuit component, particularly a wireless suspension for hard disk drives to which micro vibration is applied. Such micro vibration causes peeling off, or breaking away flutter, of an edge of the laminate. Accordingly, the shape of the laminate after etching is very important to avoid these problems, and the claimed etching rate ratio achieves this shape control.

Okamoto nowhere teaches or suggests, or even recognizes, this shape control based on the etching rate ratio as claimed. Okamoto nowhere teaches or suggests either the problem, or its solution. Instead, Okamoto at most teaches that "since the inventive polyimide laminate totally being composed of polyimide is compatible with alkaline etching process, perforation can easily be achieved." See Okamoto at col. 21, lines 49-67, particularly lines 49-51. Furthermore, Okamoto nowhere teaches or suggests a wet etching step using an alkali-

aliphatic amine solution, and nowhere teaches any etching rates for such a solution. Okamoto thus appears to suggest that the entire polyimide laminate can be etched through, regardless of any different etching rates, and fails to teach or suggest any specific etching rate ratio.

For the reasons stated above, Okamoto does not disclose, teach or suggest the claimed invention. Okamoto does not anticipate and would not have rendered obvious the etching rate ratio feature of claims 42 and 55, and thus, the claimed invention is not anticipated and would not have been obvious to one of ordinary skill in the art over Okamoto.

Claims 42 and 55 are patentable over Okamoto. Claims 44-48, 50-54, and 57-63 depend variously from claims 42 and 55 and, thus, also are not anticipated and would not have been rendered obvious by Okamoto. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Joel S. Armstrong
Registration No. 36,430

JAO:JSA

Attachment:
APICAL® Product Material Description

Date: May 22, 2008

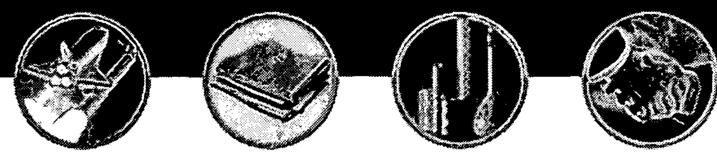
OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

APICAL® Division
KANEKA TEXAS CORPORATION

Contact Us

Apical ® Polyimide Film



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APICAL Polyimide Technical Data

Technical Data Sheets (PDF)
- Data Sheets - AV, & NP
- Technical Data Sheets, APICAL AF

APICAL Product Data
- APICAL Type AV Data
- APICAL Type AF Data
- APICAL Type NP Data
- Data Comparison

UL Data Sheets (HTML)
- UL Files - APICAL AV, NP, & AF

APICAL® Polyimide Film possesses an excellent balance of physical , thermal, electrical, and chemical properties over a wide range of temperature (-270°C [-452°F] to +400°C [+752°F]). More precise thickness control, superior web flatness, plus improved adhesion and excellent dimensional stability are standard features with APICAL Polyimide films.

Applications for APICAL Polyimide Film include flexible printed circuits, tape automated bonding, motor generator insulation, wire and cable insulation, bar code label and pressure sensitive tape. APICAL Polyimide is produced by the polycondensation reaction between an aromatic dianhydride and an aromatic diamine.

APICAL Polyimide films are certified to meet the requirements of military specification MIL-P-46112B (MR), for all types, IPC specification IPC-FC-231/1, for AV type and NP type. Written certification is available upon request.

APICAL Type AF Technical Data
APICAL Polyimide Film Type AF is FEP fluoropolymer resin-coated polyimide film developed for high temperature applications where heat sealability or improved moisture and chemical resistance are required. APICAL Polyimide AF is available in a variety of grades.

APICAL Type AV Technical Data
APICAL Polyimide Film Type AV has been successfully used in applications where a wide operating temperature range combined with excellent physical, electrical, and chemical properties is required.

APICAL Type NP Technical Data
APICAL Polyimide Film Type NP is developed using state-of-the-art technology designed specifically for applications where superior dimensional stability is essential. The superior dimensional stability characteristics of APICAL Polyimide NP make it particularly well suited for use in flexible printed circuitry and tape automated bonding applications. This product was designed to match the coefficient of thermal expansion of copper.

A Comparison of Technical Data
A comparison of APICAL polyimide film and a competing polyimide film product -- DU PONT Kapton® Type VN film.

Kapton® is a registered trademark of DU PONT.

Technical Data Sheets for APICAL AV, & NP (PDF Format)
PDF file containing the Technical Data Sheets for the following Apical products: APICAL Type NP, and APICAL Type AV.

Technical Data Sheets for APICAL AF (PDF Format)
PDF file containing the Technical Data Sheets for APICAL AF.

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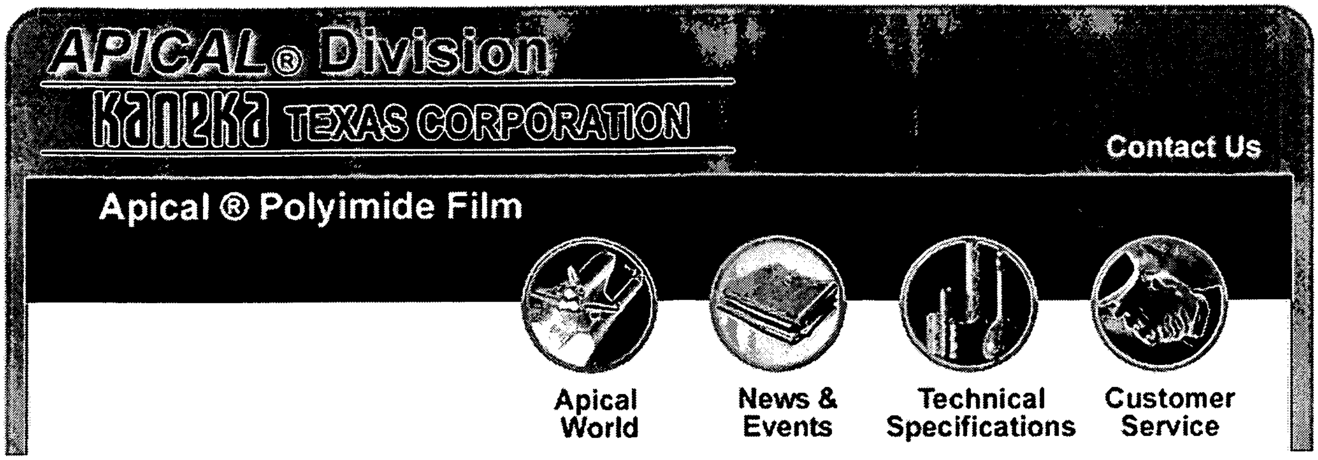

Comparison Data

- APICAL Type AF Data
- APICAL Type AV Data
- APICAL Type NP Data

Comparison of APICAL Polyimide Film and a Competitor*

Property	Unit	APICAL Polyimide 100AV	APICAL Polyimide 100NP	Competitor*	Test Method
Ultimate Tensile Strength (MD)	psi Mpa	35,000 241	44,000 303	33,500 231	ASTM D-882
Ultimate Elongation	%	95	90	72	ASTM D-882
Tensile Modulus	psi Gpa	460,000 3.2	600,000 4.1	370,000 2.5	ASTM D-2176
Density	g/cm^3	1.42	1.45	1.42	ASTM D-1505
Coefficient of Friction Kinetic	.	0.40	0.50	0.48	ASTM D-1894
Flammability	.	94 V-0	94 V-0	94 V-0	UL 94
Coefficient of Thermal Expansion (100°C to 200°C)	cm/cm/°C	$3.2x10^{-5}$	$1.6x10^{-5}$ Analyzer	$3.2x10^{-5}$	Thermal Mechanical
Shrinkage (200° C, 2 hours)	%	0.04	0.04	0.03	IPC TM 650, 2.2.4 Method A
Dielectric Strength	V/mil	7,800	8,000	7,700	ASTM D-149
Moisture Absorption 50% RH at 23°C Immersion for 24 hours at 23°C	% %	1.3 2.9	1.3 2.1	1.8 2.8	ASTM D-570

The data noted in these technical data sheets are given as examples and are not intended to be read as guaranteed values.

* These data are derived from the DU PONT catalog for Kapton® Type VN film.

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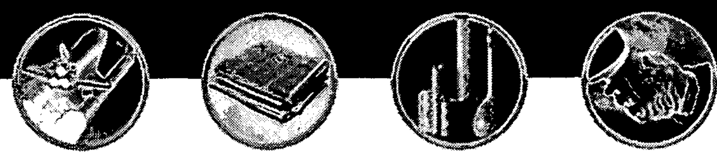

APICAL Type AF Polyimide Film

- Grade Table
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- MSDS Data sheet

Commercially available constructions are shown in the Grade Table. Other constructions are available upon request.

Grade Table

	-		Construction (um)		
Designation	Nominal Thickness		FEP	AV	FEP
120AF616	1.2 mil	30.0 u m	2.5	25.0	2.5
130AF616B	1.3 mil	32.5 u m	3.75	25.0	3.75
150AF019	1.5 mil	37.5 u m		25.0	12.5
200AF919	2.0 mil	50.0 u m	12.5	25.0	12.5
250AF029	2.5 mil	62.5 u m		50.0	12.5
300AF929	3.0 mil	75.0 u m	12.5	50.0	12.5
200AF011	2.0 mil	50.0 u m		25.0	25.0
300AF021	3.0 mil	75.0 u m		50.0	25.0
500AF131	5.0 mil	125.0 u m	25.0	75.0	25.0
120AFY616*	1.2 mil	30.0 u m	2.5	25.0	2.5
150AFY019*	1.5 mil	37.5 u m		25.0	12.5

* This grade is pigmented for color.

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- APICAL Type NP Data
- APICAL Type AV Data
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MSDS Data sheet

Mechanical Properties							
Property	120AF616	130AF616B	150AF019	250AF029	200AF919	300AF929	Method
Tensile strength, psi (Mpa), at 23°C Machine Direction (MD) and Transverse Direction (TD) (Minimum)	20,000 (138)	20,000 (138)	16,000 (112)	20,000 (138)	14,000 (97)	16,000 (112)	ASTM D-882, Method A using an Instron Tensile Tester
Elongation, % MD and TD (Minimum)	60	60	60	60	60	60	ASTM D-882, Same as above method.
Moisture absorption, % (maximum)	3.0	3.8	3.8	3.0	3.0	3.0	IPC TM-650 2.6.2, Using 24 hours immersion at 23 ° C (73 ° F)

Property	200AF011	300AF021	500AF131	120AFY616	150AFY019	Method
Tensile strength, psi (Mpa), at 23°C Machine Direction (MD) and Transverse Direction (TD)	14,000 (97)	16,000 (110)	14,000 (97)	20,000 (138)	16,000 (110)	ASTM D-882, Method A using an Instron Tensile Tester

(Minimum)						
Elongation, % MD and TD (Minimum)	60	60	60	60	60	ASTM D-882, Same as above method.
Moisture absorption, % (maximum)	3.8	3.0	3.0	3.8	3.8	IPC TM-650 2.6.2, Using 24 hours immersion at 23 ° C (73 ° F)

- **Grade Table**

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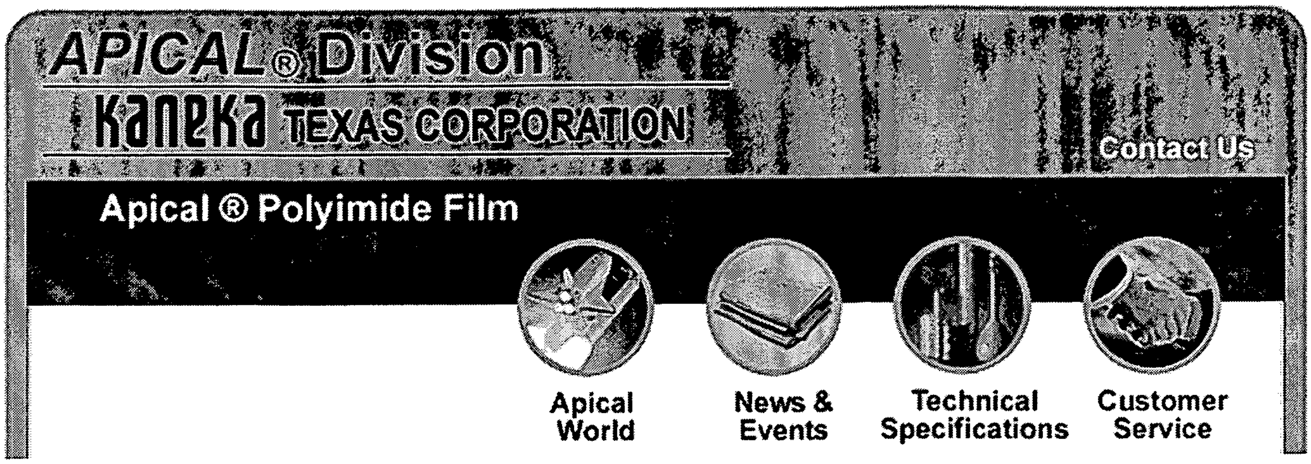

APICAL Type AF Polyimide Film

- Grade Table
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- MSDS Data sheet

Electrical Properties							
Property	120AF616	130AF616B	150AF019	250AF029	200AF919	300AF929	Method
Dielectric Strength, AC V/mil (k V/mm) (Minimum)	5,000 (197)	5,000 (197)	4,000 (158)	4,000 (158)	3,000 (118)	3,000 (118)	ASTM D-149, Flat sheet in air placed between 1/4" (6.35mm) diameter brass electrodes with 1/32" (0.8mm) edge radius subjected to 60 cycles AC voltage at 500 volts/sec. rate of rise.
Volume Resistivity, ohm-cm at 200°C (392°F) (Minimum)	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	ASTM D-257
Dielectric Constant at 1kHz (Maximum)	3.9	3.9	3.9	3.9	3.9	3.9	ASTM D-150, Using conducting silver paint electrodes, two terminal system of measurement at standard conditions.

Dissipation Factor at 1 kHz (Maximum)	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	ASTM D-150, Same as above method.

Property	200AF011	300AF021	500AF131	120AFY616	150AFY019	Method
Dielectric Strength, AC V/mil (k V/mm) (Minimum)	3,000 (118)	2,500 (98)	2,000 (79)	5,000 (197)	4,000 (157)	ASTM D-149, Flat sheet in air placed between 1/4" (6.35mm) diameter brass electrodes with 1/32" (0.8mm) edge radius subjected to 60 cycles AC voltage at 500 volts/sec. rate of rise.
Volume Resistivity, ohm-cm at 200 ° C (392 ° F) (Minimum)	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	ASTM D-257
Dielectric Constant at 1kHz (Maximum)	3.9	3.9	3.9	3.9	3.9	ASTM D-150, Using conducting silver paint electrodes, two terminal system of measurement at standard conditions.
Dissipation Factor at 1 kHz (Maximum)	0.0035	0.0035	0.0035	0.0035	0.0035	ASTM D-150, Same as above method.

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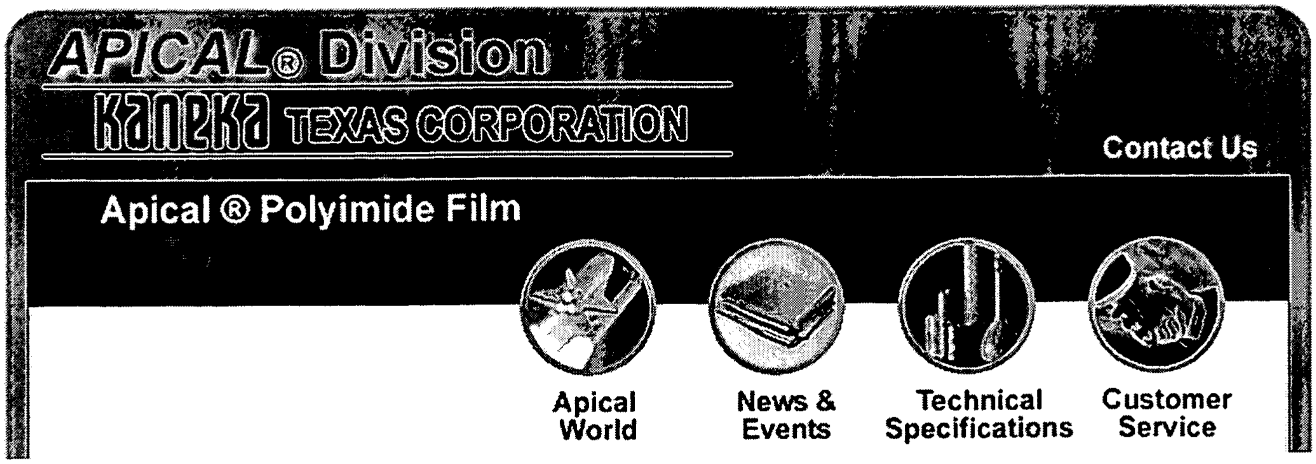

APICAL Type AV Polyimide Film

- Grade Table
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- MSDS Data sheet

Commercially available constructions are shown in the Grade Table.

Grade Table		
Designation	Nominal Thickness	
30AV	0.3 mil	7.5 um
50AV	0.5 mil	12.5 um
100AV	1.0 mil	25.0 um
200AV	2.0 mil	50.0 um
300AV	3.0 mil	75.0 um
500AV	5.0 mil	125.0 um
100AVY*	1.0 mil	25.0 um

* This grade is pigmented for color.

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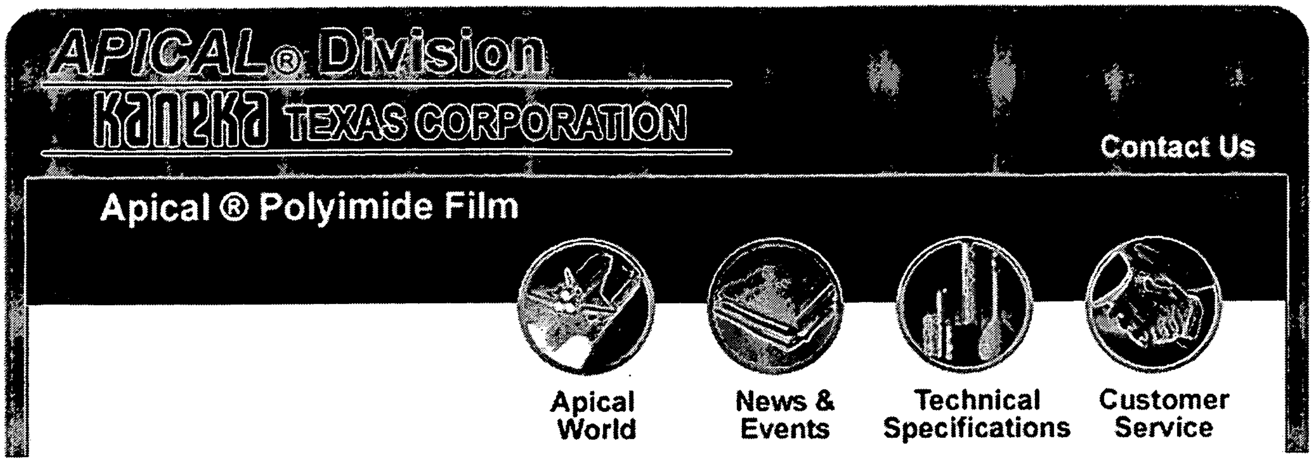

APICAL Type AV Polyimide Film

- Grade Table
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- MSDS Data sheet

Mechanical Properties								
Method	30AV	50AV	100AV	200AV	300AV	50 AV	100 AVY	Method
Tensile strength, psi (Mpa), at 23°C Machine Direction (MD) and Transverse Direction (TD) (Minimum)	15,000 (103)	15,000 (103)	24,000 (165)	24,000 (165)	24,000 (165)	24,000 (165)	24,000 (165)	ASTM D-882, Method A using an Instron Tensile Tester
Elongation, % MD and TD (Minimum)	40	40	60	60	60	60	60	ASTM D-882, Same as above method.
Shrinkage, % MD and TD at 150.C (302.F) for 30 min. (maximum)	0.50	0.10	0.10	0.10	0.10	0.10	0.10	IPC TM-650 2.2.4
Moisture absorption, % (maximum)	3.8	3.8	3.8	3.8	3.8	3.8	3.8	IPC TM-650 2.6.2, Using 24 hours immersion at 23.C (73.F)

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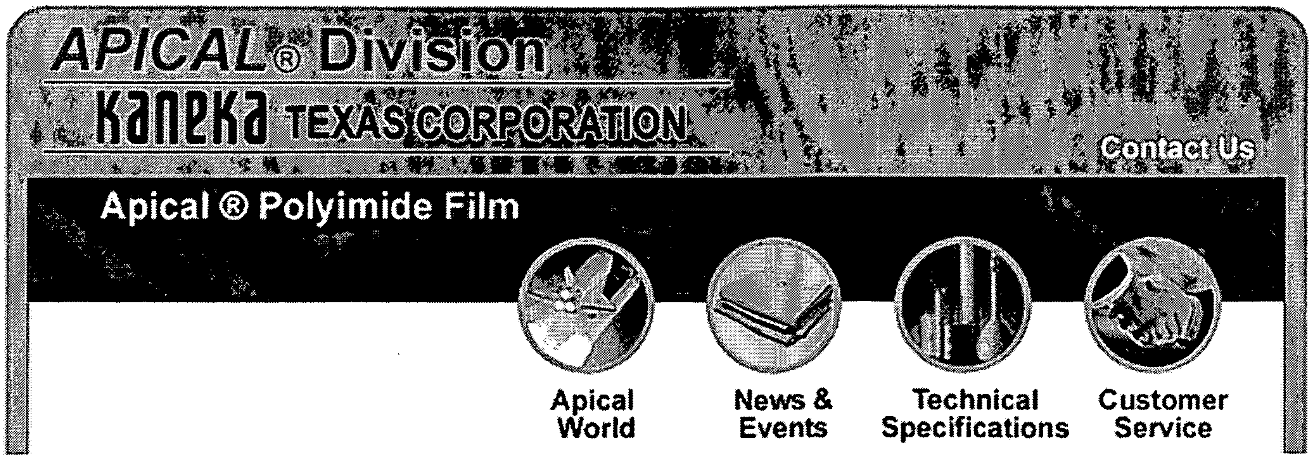

APICAL Type AV Polyimide Film

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Electrical Properties								
Property	30AV	50AV	100AV	200AV	300AV	500AV	100AVY	Method
Dielectric Strength, AC V/mil (k V/mm) (Minimum)	6,000 (236)	6,000 (236)	6,000 (236)	5,000 (197)	4,500 (177)	3,000 (118)	6,000 (236)	ASTM D-149, Flat sheet in air placed between 1/4" (6.35mm) diameter brass electrodes with 1/32" (0.8mm) edge radius subjected to 60 cycles AC voltage at 500 volts/sec. rate of rise.
Volume Resistivity, ohm-cm at 200 ° C (392 ° F) (Minimum)	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	ASTM D-257
Dielectric Constant at 1kHz	3.9	3.9	3.9	3.9	3.9	3.9	3.9	ASTM D-150, Using conducting

(Maximum)								silver paint electrodes, two terminal system of measurement at standard conditions.
Dissipation Factor at 1 kHz (Maximum)	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	ASTM D-150, Same as above method.

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APICAL Type NP Polyimide Film

- Grade Table
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- Electrical Properties
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- MSDS Data sheet

Commercially available constructions are shown in the Grade Table.

Grade Table

Designation	Nominal Thickness	
50NP	0.5 mil	12.5 u m
100NP	1.0 mil	25.0 u m
200NP	2.0 mil	50.0 u m
300NP	3.0 mil	75.0 u m
500NP	5.0 mil	125.0 u m

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Mechanical Properties						
Method	50NP	100NP	200NP	300NP	500NP	Method
Tensile strength, psi (Mpa), at 23°C Machine Direction (MD) and Transverse Direction (TD) (Minimum)	30,000 (207)	33,000 (228)	33,000 (228)	33,000 (228)	33,000 (228)	ASTM D-882, Method A using an Instron Tensile Tester
Elongation, % MD and TD (Minimum)	40	50	50	50	50	ASTM D-882, Same as above method.
Moisture absorption, % (maximum)	3.8	3.8	3.8	3.0	3.0	IPC TM-650 2.6.2, Using 24 hours immersion at 23 ° C (73 ° F)

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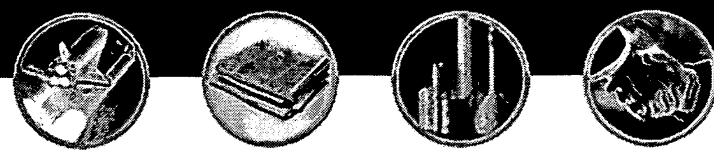

APICAL Type NP Polyimide Film

- Grade Table
- Mechanical Properties
- Electrical Properties
- Thermal Properties
- MSDS Data sheet

Electrical Properties						
Property	50NP	100NP	200NP	300NP	500NP	Method
Dielectric Strength, AC V/mil (k V/mm) (Minimum)	6,000 (236)	6,000 (236)	5,000 (197)	4,500 (177)	3,000 (118)	ASTM D-149, Flat sheet in air placed between 1/4" (6.35mm) diameter brass electrodes with 1/32" (0.8mm) edge radius subjected to 60 cycles AC voltage at 500 volts/sec. rate of rise.
Volume Resistivity, ohm-cm at 200 ° C (392 ° F) (Minimum)	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	ASTM D-257
Dielectric Constant at 1kHz (Maximum)	3.9	3.9	3.9	3.9	3.9	ASTM D-150, Using conducting silver paint electrodes, two terminal system of measurement at standard conditions.
Dissipation Factor at 1 kHz (Maximum)	0.0035	0.0035	0.0035	0.0035	0.0035	ASTM D-150, Same as above method.

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- Questions? Ask the Engineers
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